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09/869,123	10/03/2001	Karsten Reihs		2354

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EXAMINER
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BISSETT, MELANIE D

ART UNIT	PAPER NUMBER
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1711

DATE MAILED: 01/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/869,123

Applicant(s)

REIHS ET AL.

Examiner

Melanie D. Bissett

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-54 is/are pending in the application.
- 4a) Of the above claim(s) 11-26 and 29-51 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10, 27, 28 and 52-54 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

1. The rejections based on 35 USC 112, 102, and 103 have been maintained in the present Office action.

***Claim Rejections - 35 USC § 102***

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. Claims 1-6, 8-10, 28, and 52-53 are rejected under 35 U.S.C. 102(b) as being anticipated by Clark et al.
4. From prior Office actions:

Clark et al. discloses functionalized films that give ultraphobic propedies to a substrate. The substrate is a metal (column 6, lines 15-17) or a polyimide (example 1 ), (claims 5-6 and 8-9) and the coated substrate demonstrates ultraphobic behavior, with contact angles on the order of 1710 (column 6, lines 48-52), meeting this part of claims 3 and 4. Fudher, the surfaces are such that water rolls of at the "slightest inclination of the substrate" (column 6, lines 52-53). The examiner assumes that the term "slightest inclination" in Clark et al. is less than 100, thereby meeting this aspect of claim 3. The surface in Clark et al. is coated with a Langmuir-Blodgett film that gives it ultraphobic properties.

Langmuir-Blodgett films are inherently amphoteric and also meet the definition of "hydrophobic phobicization auxiliary." As such, Clark et al. also fulfills claims 10 and 28.

Clark et al. does not specify the value of S as the applicant does in claims 1 and 2. However, the applicant has not shown that the value of S is independent of the contact angle of the substrate. It appears from the current application, see table 1, that any ultraphobic surface having a contact angle above 1500 would inherently have a surface topography with the value of S in claims 1 and 2. Therefore the examiner deems that the structure in Clark et al. meets the S value requirement of claims 1 and 2.

Regarding newly added claims 52 and 53, Clark et al. discloses a surface that may be either hydrophobic or oleophobic (column 2, lines 43-44 and column 7, lines 12- 17), meeting that aspect of these claims.

5. Claims 1-5, 8, 27, and 52 are rejected under 35 U.S.C. 102(b) as being anticipated by Takahashi et al.

6. From a prior Office action:

Takahashi et al. discloses a water repellent coating composition. It teaches that the coating composition yields contact angles up to 1560 (example 1, meeting the applicant's claims 3 and 4) and that the substrate can be polyurethane (claims 5 and 9 in Takahashi et al. meeting the applicant's claims 5, 8, and 27). Takahashi et al. does not specify the value of S as the applicant does in claims 1 and 2. However, the applicant has not shown that the value of S is independent of the contact angle of the substrate.

It appears from the current application, see table 1, that any ultraphobic surface having a contact angle above 1500 would inherently have a surface topography with the value of S in claims 1 and 2. Therefore the examiner deems that the structure in Takahashi et al. meets the S value requirement of claims 1 and 2.

Takahashi et al. also does not disclose a roll-off angle, as the applicant does in claim 3. The examiner's position is that since the contact angle in Takahashi et al. is the same as the contact angle in claims 3 and 4 and since the surface in Takahashi et al. is designed to be water repellent, the surface in Takahashi et al. will inherently possess the roll-off angle that the applicant claims in claim 3.

Regarding newly added claim 52, Takahashi et al. discloses a surface that is hydrophobic, meeting that aspect of the claim.

***Claim Rejections - 35 USC § 103***

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Clark et al. in view of Baumann et al.

9. From a prior Office action:

Clark et al. is applied to claim 6 as discussed above, but does not explicitly state that the metal that is used can be an aluminum-magnesium alloy. Baumann et al. discloses an aluminum-magnesium alloy useful in the preparation of airplane fuselage surfaces (column 1, lines 45-46).

It is well known in the art that it is advantageous to have an ultraphobic surface coated on an airplane fuselage in order to prevent ice from forming on the fuselage in cold weather.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the coating in Clark et al. on the aluminum-magnesium substrate in Baumann et al. The motivation for doing so would be to provide an airplane fuselage surface that resists ice formation.

Therefore it would have been obvious to combine Baumann et al. with Clark et al. to obtain the invention as specified in claim 7.

10. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al. in view of Baumann et al.

11. From a prior Office action:

Takahashi et al. is applied to claim 1 as discussed above, and shows that the water resistant coating can be used on airplane fuselages (figure 17), but does not disclose the exact metal from which the fuselage is made. Baumann et al. discloses an aluminum-magnesium alloy useful in the preparation of airplane fuselage sudaces (column 1, lines 45-46). It is well known in the art that it is advantageous to have an ultraphobic surface coated on an airplane fuselage in order to prevent ice from forming on the fuselage in cold weather. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the coating in Takahashi et al. on the aluminum-magnesium substrate in Baumann et al. The motivation for doing so would be to provide an airplane fuselage surface that resists ice formation. Therefore it would have been obvious to combine Baumann et al. with Takahashi et al. to obtain the invention as specified in claims 6 and 7.

12. Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Clark et al. in view of Goetz et al.

13. From a prior Office action:

Clark et al. discloses a surface that meets the requirements of claim 1, but does not include a substrate made from  $\text{AlMg}_3$ . Goetz et al. discloses a substrate made from  $\text{AlMg}_3$  used in solar cells. Since it is useful for solar cells to have hydrophobic or oleophobic surfaces in order to keep them clean during use, it would have been obvious to coat the substrate in Goetz et al. with the coating in Clark et al.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to coat the substrate in Goetz et al. with the coating in Clark et al. The motivation for doing so would be to obtain a substrate (or solar cell) with hydrophobic or oleophobic surface properties. Therefore it would have been obvious to combine Goetz et al. with Clark et al. to obtain the invention as specified in claim 54.

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14. Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al. in view of Goetz et al.

15. From a prior Office action:

Takahashi et al. discloses a surface that meets the requirements of claim 1, but does not include a substrate made from  $\text{AlMg}_3$ . Goetz et al. discloses a substrate made from  $\text{AlMg}_3$  used in solar cells. Since it is useful for solar cells to have hydrophobic surfaces in order to keep them clean during use, it would have been obvious to coat the substrate in Goetz et al. with the coating in Takahashi et al.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to coat the substrate in Goetz et al. with the coating in Takahashi et al. The motivation for doing so would be to obtain a substrate (or solar cell) with hydrophobic surface properties. Therefore it would have been obvious to combine Goetz et al. with Takahashi et al. to obtain the invention as specified in claim 54.

### ***Claim Rejections - 35 USC § 112***

16. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

17. From a prior Office action:

Claims 1-10, 27-28, and 52-54 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the product made in the examples in the specification, does not reasonably provide enablement for any and every surface having the claimed properties. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims without undue experimentation.

Specifically, the claim currently covers all surfaces with the claimed properties. However, the specification does not enable one skilled in the art to make a surface with the claimed properties without using the exact methods or materials found in the examples. The full range of methods or materials that the claim covers is therefore not disclosed by the specification and one skilled in the art would require undue experimentation to discover the full scope of the applicant's invention.

***Response to Arguments***

18. The applicant argues that the declaration provided shows that surfaces having the claimed contact angle do not necessarily possess the claimed S integral value. The applicant argues that this negates the position that the S integral value would be inherent to a material having the claimed contact angle.

19. However, the applicant has shown only ***estimated*** values for the prior art. A theoretical result does not substitute for factual, measured results. In this case, it appears that three of the substrate surface dimensions of a few examples of the prior art have been used to generate a number of data points, which were then used to calculate a value for the S integral. First, it is unclear how three dimensions can generate a number of data points with certainty. Secondly, it is noted that the dimensions used are taken from the substrate but not from the *coated* substrate. The declaration states that "In the model the nanostructure elements were coated with a hydrophobic substance equivalent to  $C_8F_{17}(CH_2)_{11}SH$ ." The *model* generated from the three dimensions of the prior art additionally *theorizes* the affects of a coating. Again, theoretical results are not substitutes for measured data.

20. In response to the applicant's argument that the declaration supports the accuracy of the calculations, it is first noted that the applicant's allegations of accuracy do not constitute proof of such a statement. The applicant has not provided support to show the accuracy of such calculations. Furthermore, it is noted that this statement refers to the accuracy that can be obtained from the number of data points. However, it appears that these data points have been generated from only three dimensions. The

examiner questions the accuracy of the generated data points. Also, it is noted that these data points are generated from the substrate dimensions *but not from the coated substrate dimensions*. The applicant further theorizes the affects of this coating on the modeled surface. The applicant has not shown proof of accuracy of the calculated values.

21. Regarding the applicant's arguments that the examples and specification show various methods of achieving the invention, it is the examiner's position that, although one of ordinary skill in the art may have the ability to duplicate the applicant's examples, undue experimentation would be needed to achieve the applicant's properties otherwise. In other words, the specification and examples do not guide one of ordinary skill in the art to specific ways of achieving the properties but rather focus on a great number materials and methods that *may be used or combined* to achieve the claimed properties. The specification also focuses on the methods of measuring or calculating the claimed properties. However, this does not enable one of ordinary skill in the art to experiment within the teachings of the specification with sufficient certainty of achieving the desired results. Although a number of materials and surface modification methods have been discussed, the specific steps or combinations of materials that are used to achieve the claimed properties are not discussed.

### ***Conclusion***

22. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).



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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melanie D. Bissett whose telephone number is (571) 272-1068. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on (571) 272-1078. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

mdb

